

## PCT

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)



Rec'd PCT/PTO 29 APR 2005

10/533614

Applicant's or agent's file reference EL/2-22775	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/EP 03/00541	International filing date (day/month/year) 21.01.2003	Priority date (day/month/year) 01.11.2002
International Patent Classification (IPC) or both national classification and IPC G11B7/24		
Applicant CIBA SPECIALTY CHEMICALS HOLDING INC.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 6 sheets, including this cover sheet.  
  
☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).  
  
 These annexes consist of a total of 2 sheets.

3. This report contains indications relating to the following items:
  - I ☒ Basis of the opinion
  - II ☐ Priority
  - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
  - IV ☐ Lack of unity of invention
  - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
  - VI ☐ Certain documents cited
  - VII ☐ Certain defects in the international application
  - VIII ☐ Certain observations on the international application

Date of submission of the demand  14.07.2003	Date of completion of this report  10.12.2004
Name and mailing address of the international preliminary examining authority:   European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer  Vogt, C  Telephone No. +31 70 340-3706  

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/EP 03/00541

**I. Basis of the report**

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

**Description, Pages**

1-18 as originally filed

**Claims, Numbers**

1-9 received on 07.06.2004 with letter of 02.06.2004

**Drawings, Sheets**

1/2-2/2 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).  
☐ the language of publication of the international application (under Rule 48.3(b)).  
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.  
☐ filed together with the international application in computer readable form.  
☐ furnished subsequently to this Authority in written form.  
☐ furnished subsequently to this Authority in computer readable form.  
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.  
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:  
☐ the claims, Nos.:  
☐ the drawings, sheets:

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5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Yes: Claims	1-9
	No: Claims	
Inventive step (IS)	Yes: Claims	1-9
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-9
	No: Claims	

2. Citations and explanations

**see separate sheet**

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**Re Item V**

1. Reference is made to the following documents:

D1: DATABASE WPI, JP 52 072627 A

D2: US-B-6452899

D3: DATABASE WPI, JP 63 009576 A and Japanese Patent

D4: EP-A-0 676 751

2. **NOVELTY:**

D1 discloses an ink composition which contains a dye and a solvent selected from (di)ethylbenzene, (iso)propylbenzene, butylbenzene and t-butylbenzene.

The subject-matter of claim 1 differs from the liquid composition of D1 in that a linear, branched and/or cyclic non-aromatic hydrocarbon is added in a specific weight amount and weight ratio to the composition.

D2 discloses an optical recording medium and a method for making it. The optical recording medium comprises a substrate with a grooved side, a recording layer on top of it, which contains cyanine dye, a reflective layer and a protective layer.

The subject-matter of claim 6 differs from the process for manufacturing the optical recording medium of D2 in that the recording layer is produced by coating on a substrate a liquid composition which comprises from 0.1 to 20 wt% of a dye with a solid state absorption band maximum in the spectral region from 300 to 800 nm, from 0.5 to 79.9 wt% of a compound as represented by formula (I) and from 20 to 99.4 wt.% of a linear, branched and /or cyclic non-aromatic hydrocarbon, and the weight ratio of the hydrocarbon to compound (I) is from 4:1 to 99:1.

The subject-matter of claim 7 differs from the optical recording medium of D2 in the particular groove filling value  $Gf_v$  -under the consideration that OPD is the average optical density of the recording medium -.

The subject-matter of claim 9 differs from the optical recording medium of D2 in the particular groove filling grade  $Gf_g$ .

D3 discloses an optical recording medium and a method for making it. The optical recording medium comprises a substrate with a grooved side, a recording layer on top of it, a reflective layer and a protective layer. The recording layer is obtained by coating on a substrate a nickel-complex dye and a solvent such as toluene, t-butylbenzene.

The subject-matter of claim 1 differs from the liquid composition of D3 in an additional non aromatic hydrocarbon solvent in a particular weight amount and weight ratio.

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The subject-matter of claim 6 differs from the process for manufacturing an optical recording medium of D3 in that the liquid composition as defined in present claim 1 is used.

The subject-matter of claim 7 differs from this known optical recording medium in the claimed groove filling value  $Gf_v$ .

The subject-matter of claim 9 differs from this known optical recording medium in the claimed groove filling grade  $Gf_g$ .

D4 discloses an optical recording medium and a method for making it. The optical recording medium comprises a substrate with a grooved side, a recording layer on top of it, a reflective layer and a protective layer. The recording layer is obtained by coating on the substrate a cyanine dye dissolved in fluoropropanol.

The subject-matter of claim 6 differs from the process for manufacturing of D4 in that the recording layer is produced by coating a liquid composition which contains from 0.1 to 20 wt% of a cyanine dye with a solid state absorption band maximum in the spectral region from 300 to 800 nm, from 0.5 to 79.9 wt% of a compound as represented by formula (I) as defined in present claim 1 and from 20 to 99.4 wt.% of a linear, branched and /or cyclic non-aromatic hydrocarbon, and the weight ratio of the hydrocarbon to compound (I) is from 4:1 to 99:1.

The subject-matter of claim 7 differs from the optical recording medium of D4 in the specific groove filling value  $Gf_v$ .

The subject-matter of claim 9 differs from the optical recording medium of D4 in the particular groove filling grade  $Gf_g$ .

The subject-matter of claims 1 to 9 is therefore new (Article 33(2) PCT) with regard to the available prior art.

**3. INVENTIVE STEP:**

Document D3, which is considered to represent the most relevant state of the art, discloses a liquid composition from which the subject-matter of claim 1 differs in that a linear, branched and/or cyclic non-aromatic hydrocarbon is added to the liquid composition containing a dye component and a solvent component as represented by formula (I).

D3 furthermore discloses a process for manufacturing an optical recording medium and an optical recording medium.

The subject-matter of claim 6 differs from the process for manufacturing an optical recording medium of D3 in that the liquid composition as defined in present claim 1 is

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used.

The subject-matter of claim 7 differs from the optical recording medium of D3 in the claimed groove filling value  $Gf_v$ .

The subject-matter of claim 9 differs from the optical recording medium of D3 in the claimed groove filling grade  $Gf_g$ .

The problem to be solved by the present invention may be regarded as providing an optical recording medium having improved reflectivity and signal modulation  $I_{lf}/I_{top}$  especially at low-speed recording.

The solution to this problem proposed in claims 1, 6, 7 and 9 of the present application is considered as involving an inventive step (Article 33(3) PCT).

The subject-matter of claims 1 and 6 resides in the addition of a non aromatic hydrocarbon solvent to the liquid coating composition. Said addition of non aromatic solvent can be shown to possess improved reflectivity and signal modulation  $I_{lf}/I_{top}$  especially at low-speed recording as demonstrated on page 15, table 1, Comparative Examples 2 and 3.

There is no teaching nor suggestion in D3 alone or in combination with other prior art documents to add a non aromatic hydrocarbon solvent to the liquid coating composition as defined in present claims 1 and 6 in order to solve the posed problem. Thus, the subject-matter of claims 1 and 6 is inventive.

The subject-matter of claims 7 and 9 resides in the particular selection of groove filling value  $Gf_v$  and groove filling grade  $Gf_g$ .

There is no teaching nor suggestion in D3 alone or in combination with other prior art documents to replace the grooved surface of the substrate by the grooved substrates as defined in present claim 7 characterized by the particular groove filling value  $Gf_v$  and by the grooved substrate as defined in present claim 9 characterized by the groove filling grade  $Gf_g$ .

Thus, the subject-matter of claims 7 and 9 is inventive.

Claims 2 to 5, and 8 are dependent on claim 1 and claim 7; respectively; and as such also meet the requirements of the PCT with respect to novelty and inventive step.

EPO - DG 1

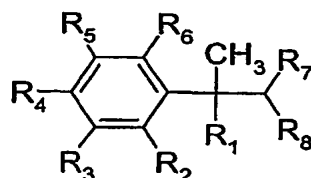
07.06.2004

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Claims:

(97)

1. A liquid composition comprising from 0.1 to 20% by weight of a dye having a solid state absorption band maximum in the spectral region from 300 to 800 nm, from 0.5

to 79.9% by weight of a compound of formula  (I), wherein R<sub>1</sub> to

- 5 R<sub>8</sub> are H, CH<sub>3</sub> or C<sub>2</sub>H<sub>5</sub>, with the proviso that the total number of carbon atoms in R<sub>1</sub> to R<sub>8</sub> is 1 or 2, from 20% to 99.4% by weight of a linear, branched and/or cyclic non-aromatic hydrocarbon, and optionally from 0 to 79.4% by weight of one or more further components, all based on the weight of the solution, and the weight ratio of hydrocarbon to compound of formula (I) is from 4 : 1 to 99 : 1.
- 10 2. A composition of claim 1, wherein the compound of formula (I) is sec-butylbenzene, tert-butylbenzene, 2-pentylbenzene, isopent-2-ylbenzene or tert-amylbenzene, or a mixture thereof, preferably sec-butylbenzene or tert-butylbenzene, most preferred tert-butylbenzene.
- 15 3. A composition of claim 1 or 2, wherein the dye is a phthalocyanine, preferably a nonpolar phthalocyanine, most preferred a copper or palladium phthalocyanine.
4. A composition of any claim 1 to 3, wherein the hydrocarbon is alicyclic, and the weight ratio of hydrocarbon to compound of formula (I) is preferably from 17 : 1 to 76 : 1.
- 20 5. A composition of claim 4, wherein the hydrocarbon is selected from cycloalkanes substituted by one or more C<sub>1</sub>-C<sub>4</sub>alkyl groups and/or having a boiling point of ≤170 °C, preferably methylcyclohexane, 1,2-dimethyl cyclohexane or ethyl cyclohexane.
6. A process for manufacturing an optical recording medium comprising a substrate with a grooved side, a recording layer overlying the substrate on the grooved side, a

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reflective layer overlying the recording layer, and a protective layer overlying the reflective layer, wherein the recording layer is produced by coating a liquid composition of any claim 1 to 5.

7. An optical recording medium comprising a substrate with a grooved side, a recording layer overlying the substrate on the grooved side, a reflective layer overlying the recording layer, and a protective layer overlying the reflective layer, characterized in that it has a groove filling value  $GF_v = \frac{d_{\text{groove}} - d_{\text{land}}}{\text{OPD} \cdot 1\text{nm}} = \frac{d_{\text{sub}} - d_{\text{abs}}}{\text{OPD} \cdot 1\text{nm}}$  of from 360 to 600, wherein  $d_{\text{sub}}$  is the depth of the empty groove,  $d_{\text{groove}}$  is the thickness of the dye layer in the groove,  $d_{\text{land}}$  is the thickness of the dye layer on top of the land areas of the disc and  $d_{\text{abs}}$  is the depth difference between the surface of the dye layer in the groove and the surface of the dye layer on top of the land areas of the disc.
8. An optical recording medium of claim 7, wherein the groove in the substrate ( $d_{\text{sub}}$ ) is from 200 to 225 nm deep and from 580 to 700 nm, preferably from 620 to 680 nm wide at half depth, the dye film average optical density is from 0.21 to 0.27, preferably from 0.21 to 0.25, and the depth in dye layer  $d_{\text{abs}}$  lies in the range from 100 to 125 nm.

9. An optical recording medium comprising a substrate with a groove and a recording layer, characterised in that the groove filling grade  $GF_g = \left\{ 1 - \frac{d_{\text{land}}}{d_{\text{groove}}} \right\} \cdot 100$  is from 85 to 100, preferably from 90 to 100, most preferred from 95 to 100, wherein  $d_{\text{land}}$  is the thickness of the dye layer on top of the land areas of the disc and  $d_{\text{groove}}$  is the thickness of the dye layer in the groove.